CLAIMS

1. A method of fabricating at least one polycrystalline silicon plate (68, 70) with one (64, 66) of its two faces presenting predetermined relief, in which method a layer of polycrystalline silicon (60, 62) is deposited on at least one (56, 58) of the two faces of a support (50), the method being characterized by the steps of:

· embossing said face (52, 54) of the support (50) to impart thereto a shape that is complementary to said relief;

· depositing said polycrystalline silicon layer (60, 62) on said embossed face (56, 58) of the support (50), the surface (64 or 66) of said polycrystalline silicon layer situated in contact with said embossed face (56 or 58) then taking on the shape of said relief;

· cutting up said polycrystalline silicon layer (60 or 62); and

· eliminating said support in order to obtain said polycrystalline silicon plate (68 or 70).

2. A method according to claim 1, characterized in that said support (50) is a carbon tape.

3. A method according to claim 2, characterized in that said carbon tape is covered in a protective coating (56, 58) of pyrolytic graphite after its surface (52, 54) has been embossed in order to impart thereto said shape complementary to said relief.

4. A method according to any preceding claim, characterized in that said face (46, 48) of the support is embossed in order to impart thereto a shape complementary to said relief (44) by being pinched between two rollers (30, 32) and by causing said support (28) to run between the rollers, the embossing surface of at least one of said rollers having the shape of said predetermined relief.

5. A method according to any one of claims 1 to 3, characterized in that said support face is embossed to impart thereto a shape complementary to said relief by embossing a die against said support, the embossing surface of the die having the shape of a plane surface on which said predetermined relief has been embossed.

6. A method according to claim 4 or claim 5, characterized in that said surface of said roller (30, 32) or of said die is made of a material selected from: carbon; silicon carbide; silicon; and silicon nitride.

7. A method according to of claim **4 or claim 6**, characterized in that the embossing surfaces of the two rollers (30, 32) have the shape of said relief, both faces (46, 48) of said support (28) then taking on the shape complementary to said relief (44) during said pinching and running between said rollers.

8. A method according to claims 3 and 7, characterized in that a polycrystalline silicon layer (88, 90) is deposited simultaneously and continuously on both of the faces (74, 76) of said tape (72) by causing it to pass through a bath of molten silicon (80) and by pulling it vertically upwards at constant speed (86) so as to exit said bath, thereby obtaining two layers (88, 90) of polycrystalline silicon, each having a surface with said relief.

9. A method according to any preceding claim, characterized in that said support (28, 50, 72, 100) is eliminated by being burnt off by heating the assembly constituted by the support and the polycrystalline silicon to high temperature.

10. A method according to claim 9, characterized in that the face (64, 66) of the polycrystalline silicon that has the shape of said relief is cleaned after said support has been burnt off.

11. A method according to any preceding claim, characterized in that said support (28, 50, 72, 100) presents a thickness lying in the range 200 µm to 350 µm, and preferably in the range 200 µm to 300 µm.

12. A method according to any preceding claim, characterized in that the thickness of the polycrystalline silicon layer (68, 70, 88, 90) lies in the range 40 µm to 300 µm.

13. A method according to claim 3, characterized in that the thickness of said protective coating (56, 58) is substantially equal to 1 µm.

14. A method according to any preceding claim, characterized in that said face (46, 48, 52, 54) of said support (28, 50) is embossed in such a manner as to texture said face (64, 66) of said polycrystalline silicon layer (68, 70), said relief (44) being selected in such a manner as to increase the probability of incident light being absorbed in said layer.

15. A method according to claim 14, characterized in that said relief in the form of an array of substantially identical pyramids (14).

16. A method according to claim 15, characterized in that the side faces of each of said pyramids (14) form angles that are substantially equal to 45° with the base of the pyramid.

17. A method according to claim 15 or claim 16, characterized in that said pyramids (14) are of a height lying in the range 1 μm to 10 μm.

18. A method according to any preceding claim, characterized in that said face of said support (28, 50, 72, 100) is embossed in such a manner that said surface of said silicon layer is marked with a pattern characterizing said plate or a series of polycrystalline silicon plates.

19. A method according to claim 18, characterized in that said pattern is a bar code.

20. A method according to claim 18, polycrystalline in that said pattern is a number.

21. A method according to any one of claims 14 to 17 and 18 to 20, characterized in that said relief is constituted by the texturing said face of said polycrystalline silicon layer and by said pattern characterizing said plate.

22. A method according to any preceding claim, characterized in that grooves are embossed in said face of said support (100) in such a manner that ribs of shape complementary to the grooves are formed on said surface of the silicon layer, thereby increasing the stiffness of said layer.

23. A method according to claim 22, characterized in that said grooves are of a depth of a few tens of micrometers.

24. A method according to claim 22 or claim 23, characterized in that the greatest width of said ribs is no more than a few millimeters.

25. A method according to claim 2 and any one of claims 22 to 24, characterized in that said ribs extend in the length direction of said tape (100).

26. A method according to claim 2 and any one of claims 22 to 24, characterized in that said ribs extend in the width direction of said tape (100).

27. A method according to claims 25 and 26, characterized in that said relief is waffle-shape, being constituted by a grid of ribs in the length direction and in the width direction of said tape.

28. A method according to claims 7 and 25, characterized in that each of said rollers (92, 94) is made up of at least two knurling wheels (102-108 and 118-124) each having a face forming an embossing face, said knurling wheels being separated from one another by disks (110-116 and 126-132) each having a portion (134) projecting beyond the embossing faces of said knurling wheels, said embossing surfaces of the rollers being constituted by said embossing faces of said knurling wheels forming the texturing and/or the marking of said silicon layer, and said projecting portions (134) of said disk forming grooves (136) in the support tape (100) and forming said relief in the shape of ribs on the layers of silicon.

29. A method according to claim 18 and claim 28, characterized in that each of said rollers (92, 94) is made up of a succession of knurling wheels (102-108 and 118-124) separated from one another by disks (110-116 and 126-132), each of said disks having a portion (134) projecting beyond the surfaces of said knurling wheels to create grooves (136) in the support tape (100), the spacing between said grooves (136) constituting said pattern characterizing said plate or said series of polycrystalline silicon plates.

30. A method according to claims 7 and 26, characterized in that each of said rollers (92, 94) is made up of at least two knurling wheels revolving about an axis of rotation, each having a face forming an embossing face, at least one of said knurling wheels including longitudinal ribs (134) parallel to said axis of rotation.